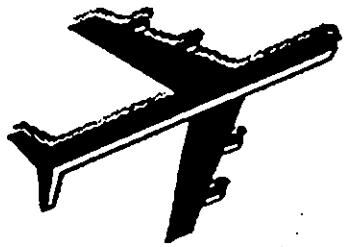
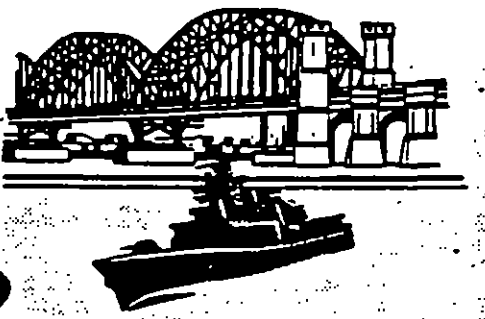
"Asbestos Operations and Maintenance" manual prepared by the Port Authority's Asbestos Management Division in July of 1991

PLAINTIFF'S EXHIBIT PX-908

THE PORT AUTHORITY OF NY&NJ





Asbestos

Operations and Maintenance

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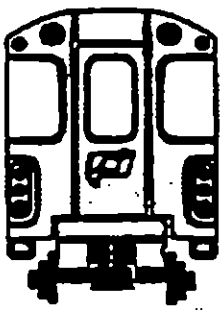

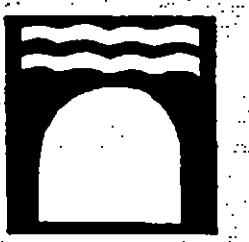

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INTRODUCTION

This Asbestos Operations and Maintenance (O&M) Manual has been prepared by the Asbestos Management Division of The Port Authority of New York and New Jersey for use by its employee when performing O&M activities. Under the direction of the staff of this division and other players in the Asbestos Program of the Port Authority, the training curriculum contained within this manual was developed by HYGIENETICS, Inc., the agency's training consultant.

In the mid 1980s, the Port Authority recognized a need for an effective Asbestos Program. Consequently, the agency established the Asbestos Control Program. This program was headed by the Director, Asbestos Control Program, an executive level management staff member whose primary responsibilities were the developing and implementing of policies for the management of all aspects of the asbestos issue for the Port Authority, including issues of safety, cost effectivness and cost recovery and public, patron, tenant and employee awareness.

In addition, the Asbestos Management Division was established to provide in-house technical consultation, conduct baseline surveys for the identification of asbestos containing material(ACM) (ACM), on-site monitoring for all abatement projects undertaken by the Port Authority and training program coordination. Other Port Authority divisions, such as the Engineering Design Division were charged with assisting the Director as needed.

The first O&M training program was conducted in September, 1989. Employees undergoing this training and performance of the O&M activity are done on a voluntary basis. Curently, there is no additional compensation offered to employees performing this activity.

Medical Clearance to wear a respirator and a respirator fittest is performed by the staffs of the Port Authority's Office of Medical Services and Environmental Division respectively prior to an employee undergoing O&M training.

Tracking of O&M trained employees as well as the maintenance of the records documenting the O&M activities is the responsibility of the Asbestos Mangement Division. However, early in the program the need for a local or facility representative to be involved in the asbestos activities of their facility became apparent. Consequently, the Facility Asbestos Coordinator's Program was established.

The managers of the various Port Authority facilities were asked to designate a person or persons who would be responsible for tracking the asbestos activities of the facility. This tracking included identifying employees for O&M training, arranging for the disposal of the asbestos debris and keeping the Asbestos Management Division informed of the O&M activities.

There is random air and personal monitoring during the O&M activity. It is the responsibility of the Facility Asbestos Coordinator to arrange for the monitoring. Results of the monitoring are maintained by the Coordinators.

Since the first O&M training session, there have been approximately 27 subsequent sessions; refresher programs are offerred on an annual basis. Medical Clearance and respirator fittest are required for entrance into the refresher sessions.

Currently, there are 275 employees trained in O&M activities at 13 different facilities. There has been an average of 20.46 activities per facility; a generation of 38.31 bags of debris per facility and an average of 227.71 man hours spent on O&M activities per facility thus far.

July, 1991

Cardinal

PORT AUTHORITY ASBESTOS POLICY

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
ASBESTOS MANAGEMENT AND CONTROL PROGRAM

One of the principal objectives of The Port Authority of New York & New Jersey is to maintain safe facilities for patrons, tenants, employees and others. Since asbestos is present at Port Authority facilities and, if disturbed, may present a potentially hazardous condition, a policy and implementing practices and procedures have been developed.

I Policy

It is the policy of The Port Authority to undertake asbestos abatement and related actions in a cost-efficient and effective manner when:

- o Unsafe or potentially hazardous conditions require action.
- o Asbestos will be disturbed to perform necessary operations and maintenance work and/or to advance capital projects.
- o Abatement is part of a business arrangement or marketing strategy.

To achieve these policies, The Port Authority has established the following practices and procedures.

II Practices

- o Properties under the jurisdiction of the Port Authority are surveyed to determine the presence and condition of asbestos material (i.e. air and raw bulk samples are analyzed).
- o When asbestos containing materials (ACM) are found, they are prioritized and action is taken when appropriate.
- o Asbestos surveys are consulted before any material suspected to contain ACM is disturbed.
- o In the absence of survey data, employees working in areas typically having ACM must assume that asbestos is present.
- o Port Authority safety requirements, (which incorporate the mandates of federal law and the general practice of following local government laws and regulations where appropriate), are observed in situations where asbestos may be disturbed.

III Procedures

A. Training

- o No employee is authorized to disturb asbestos unless properly trained.
- o Port Authority staff working in the proximity of asbestos or having asbestos issues involved with their work assignments are required to attend four (4) hours of Asbestos Awareness Training.
- o An employee is authorized to disturb up to 10 square feet (or 10 linear feet) of asbestos using appropriate work procedures, provided he or she has had a minimum of sixteen (16) hours of specific asbestos training.

B. Abatement - Port Authority Process

- o Determination as to whether asbestos abatement is necessary and how it should be performed, is, in the first instance, the responsibility of the facility staff, the Resident Engineer's office, the Asbestos Management Division and the Environmental Unit of the Engineering Design
- o After asbestos abatement is deemed appropriate, the Asbestos Management Division is responsible for the issuance of an Asbestos Abatement Permit authorizing the work to be performed in accordance with agreed upon procedures and submittals.
- o Upon request, the Manager of the Asbestos Management Division may approve a variance to abatement regulations or operations and maintenance work procedures.
- o Generally, all Port Authority abatement contracts are monitored on a full time basis by a member of the Asbestos Management Division, their consultant or, when qualified and available, facility staff under the direction of the Asbestos Management Division.
- o Asbestos Management Division performs final air clearance testing for all Port Authority abatement contracts.
- o Abatement work in excess of $150,000.00 is generally awarded through the competitive bid process to contractors who have been prequalified and are on current select lists.

- o Call-In asbestos abatement contracts do not exceed $150,000.00 unless otherwise approved by the Engineering Design Division's Environmental Engineering Unit, the Asbestos Management Division, and the Asbestos Control Program

C. Abatement - Tenant Process

- o No tenant area is altered nor is an asbestos abatement permit issued without an approved Tenant Alteration Application from the Port Authority.
- o Tenant abatement work is performed in accordance with Port Authority specifications.
- o Tenant abatement work is approved by the Asbestos Management Division and the Engineering Design Division's Environmental Engineering Unit.
- o Tenant abatement work is audited by the Asbestos Management Division and re-occupancy is authorized after final air clearance is either conducted or reviewed by the Asbestos Management Division.

IV Funding

- o Annual expenditures for asbestos abatement are budgeted within departmental budgets.
- o Line departments, with the assistance of the Environmental Unit of the Engineering Design Division and the Asbestos Management Division of the Treasury Department, utilize facility baseline surveys to identify and propose asbestos resource requirements.
- o Proposed departmental asbestos resource requirements are consistent with the Executive Director's Guidance and departmental financial targets.
- o Specific asbestos abatement work is proposed on the Asbestos Resource Requirement Form which is reviewed by the Asbestos Control Program staff prior to budget submittals to the Management and Budget Department.
- o Funds for unbudgeted and approved asbestos abatement work are provided through trade-offs of budgeted asbestos projects or from offsets of other approved resources.

THE PORT AUTHORITY OF NY & NJ Memorandum

TO All Facility Managers
FROM Richard Peduto
DATE: October 3, 1989
SUBJECT: EMPLOYEES AUTHORIZED TO DISTURB ASBESTOS

REFERENCE: Memo to A. Barber, R. Kelly, P. LaRocco, L. Liburdi M. Sloan, From: R. Peduto, Dated 5/19/89

COPY TO: S. Berger, P. Falvey, S. Frigand, K. MacKay, E. O'Neill, M. Pachter, J. Vanacore, B. Weintrob, Line and Staff Department Directors

During the course of presenting asbestos awareness this summer, a number of staff asked about The Port Authority's policy concerning who is authorized to disturb asbestos at our facilities. Although the question was answered when asked, I thought it appropriate to cover this issue with you.

In the referenced memorandum above, you will note it is The Port Authority's policy that "no employee is authorized to disturb asbestos unless properly trained". In the context of our policy, this means that at a minimum, an employee must have successfully completed an approved asbestos operations & maintenance training program:

- to disturb even minor amounts of asbestos while performing routine or emergency assignments
- come into contact with asbestos fallout

In general, work areas involving significant amounts of asbestos, i.e. in excess of 10 square feet or 10 linear feet of asbestos containing material, are normally performed by either the assigned call-in contractor or a contractor from our select list.

It should be mentioned, however, the mere presence of asbestos in an area does not preclude any employee from entering that area to perform his/her work assignments. To reiterate, if asbestos is not going to be disturbed during the work assignment, any employee can perform his/her work assignments throughout the entire facility.

If there are further issues to discuss on this subject or any others concerning our Asbestos Control Program, please feel free to contact me directly.

Richard Peduto, Director
Asbestos Control Program

Attachment

Cardinal

THE PORT AUTHORITY

RESPIRATORY PROTECTION PROGRAM

ENVIRONMENTAL MANAGEMENT DIVISION

Revised 7/91

THE PORT AUTHORITY RESPIRATORY PROTECTION PROGRAM

The Port Authority Respiratory Program is designed to protect employees from airborne toxic agents and is administered by the Environmental Management Division.

I. EVALUATION OF THE WORKPLACE

The Environmental Management Division will conduct surveys to determine concentrations of contaminants and maintain surveillance of work area conditions and the degree of employee exposure. The most effective way to reduce exposure to airborne contaminants is to eliminate or reduce the problem at its source. This can frequently be accomplished by enclosure or confinement of the operation, general and local ventilation, substitution with less toxic materials or administrative limits. The use of respirators is the least desirable method of controlling exposure to airborne contaminants due to worker stress, reduced efficiency and increased work time. However, when engineering and administrative controls are not feasible, personnel will be provided with respiratory protection equipment (RPE) when such equipment is necessary to protect the employee. RPE shall be provided which is applicable and suitable for the purpose intended.

II. RPE ELIGIBILITY

RPE eligibility shall be determined by unit management using criteria established by the Environmental Management Division in accordance with current standards. The names of these eligible employees shall be submitted for evaluation to the Port Authority Medical Office by the employees' unit. The Environmental Management Division must be copied on all correspondence regarding the Respiratory Protection Program to maintain a complete and current file on each employee.

III. MEDICAL EVALUATION

The medical standards for use of RPE shall be established by the P.A. Medical Director, based on accepted practice.
Prior to fit-testing and the issuance of RPE, the individual employee must be assessed by the Office of Medical Services to determine if the employee is medically able to use this equipment. The Office of Medical Services will notify the employee, his/her supervisor and the Environmental Management Division of their ability or inability to use RPE. In addition, the employee must be periodically evaluated by the Medical Office, after the RPE has been issued, to assure that the employees' medical status has not changed.

IV. RPE TRAINING AND FIT-TESTING

The Environmental Management Division will decide on the type of

respiratory protection equipment to use for each occupational situation. See Guidelines Attachment A.
RPE Training and Fit-testing sites will be jointly selected by the Environmental Management Division and facility supervisors to accommodate facility scheduling and to minimize employee time away from work.

All negative pressure respiratory protection equipment must be individually fit-tested using Occupational Safety and Health Administration (OSHA) recommended methods. The fit-testing procedures shall be qualitative or quantitative as detailed in Attachment B.

At the time of the fit-test, each employee will be instructed in the proper use, care and storage of the individually issued respirator. Special emphasis will be placed on proper positioning on the face, adjustment of the straps and testing for leaks. Supervisors of personnel who use RPE should be readily familiar with its proper use. Supervisors are obligated to perform periodic spot checks of their employees using respirators to make sure the equipment is being used and maintained properly.
The respiratory protection program will be evaluated on an annual basis to determine training requirements and the adequacy of the RPE provided when compared to periodic monitoring data.

A respirator refit shall be conducted every six months from the initial fit date for those employees who are active participants in the Asbestos Operations and Maintenance Program, as well as those employees determined by the Environmental Management Division to have occupational exposure to lead.

Conditions that may interfere with facepiece sealing, such as a significant change in weight (10% or more), significant scarring in the area of the face seal, dental changes, reconstructive or cosmetic surgery, or any other condition that may affect the seal of the facepiece shall warrant a refit. Refitting shall be done upon request, as scheduled through the employees' supervisor.
No RPE shall be issued to employees for use unless they have been fit-tested.

V. INSPECTION AND MAINTENANCE OF RPE

A. Cartridge Type

1. Respiratory protection equipment shall be inspected before use and cleaned and inspected again at the conclusion of each work period. Pre-moistened individual germicidal wipes will be provided for cleaning the units. Any unit showing deterioration will be replaced.

2. Respirators shall be stored in clean air-tight bags and stored in such a manner that outside pressures shall not distort the facepiece.

3. Respirator cartridges will be changed when there is difficulty in breathing through them or a detectable odor of the chemical is noted by the user.

B. Self-Contained Breathing Apparatus (SCBA)

1. Each SCBA unit shall be inspected monthly, or as specified in Attachment D. Air cylinders shall be fully charged and it shall be determined that the regulator and warning devices function properly. A record shall be kept of inspection dates and maintenance performed on SCBA units. SCBA units must be cleaned and disinfected after use. After inspection and cleaning, SCBA units shall be stored to protect against extreme heat and cold, excessive moisture and dust. SCBA units should be stored so that the facepiece and exhalation valve will rest in a normal undistorted position. This will prevent the elastomer of the facepiece from setting in an abnormal shape thereby impairing its function.

2. Replacement of parts, repair and/or inspection on SCBA units shall be performed only by factory certified personnel. Repair parts shall be manufactured and approved by the SCBA unit manufacturer. All repairs must be performed in accordance with manufacturers' standards and specifications. Field maintenance personnel will perform only those functions for which they are certified.

3. The quality of breathing air shall meet at least the requirements for Grade D breathing air as described in Compressed Gas Association (CGA) Commodity Specification G7.1-1966. The compressor for supplying the breathing air shall be equipped as a breathing air type compressor. It shall be so constructed and situated as to avoid entry of contaminated air into the system. Suitable in line air purifying solvent beds and filters shall be installed to ensure breathing air quality. If an oil lubricated compressor is used, it shall have a high temperature and carbon monoxide alarm. The breathing air shall be tested by an approved laboratory at the ratio of four (4) samples from every seventy (70) cylinders filled to insure that the breathing air meets the CGA Grade D Standards.

ATTACHMENT A

RPE GUIDELINES

1. All RPE must be NIOSH approved for the specific contaminant and its concentration.

2. The oxygen (O_2) concentration of any atmosphere entered must be at least 19.5% if a cartridge type respirator is to be used. (These units do not supply oxygen). If a lesser oxygen concentration is expected, or if the O_2 concentration is unknown, the use of a self-contained breathing apparatus (SCBA) is required. SCBA units are also required for protection against toxic agents with little or no warning properties.

3. All negative pressure respiratory protection equipment will be assigned to individuals for their exclusive use. Replacement units will be kept at the facility on reserve.

4. Respirators shall not be fitted or worn if facial hair comes between the sealing surface of the facepiece and the face or if facial hair interferes with valve function. Also, a proper facepiece to face seal cannot be established if temple bars of eyeglasses extend through the sealing edge of a full facepiece. Therefore, eyeglass adapter kits specified by each manufacturer must be used by those individuals using full facepieces. The use of contact lenses is prohibited when using full face respirators or SCBA units. Use of eye protection such as chemical goggles is recommended when using half-face respirators.

5. Two fit checks shall be conducted by the wearer each time the respirator is donned or adjusted to determine if the respirator is properly seated and that the inhalation and exhalation valves are functioning correctly.

   A. EXHALATION VALVE FIT CHECK

      To conduct this check, place the palms of the hands over the face of each cartridge, inhale and hold your breath for five (5) seconds. If the facepiece collapses slightly and no air leaks between the facepiece and the face are detected, a good fit has been obtained and the exhalation valve is functioning correctly.

   B. INHALATION VALVE FIT CHECK

      This check is carried out by covering the opening of the exhalation valve cap with the heal of your palm and simultaneously exhaling. If the facepiece bulges slightly and no air leaks between the facepiece and face are detected, a good fit has been obtained and the inhalation valves (2) are functioning correctly.

6. RPE is to be used only for the material and concentration authorized by the Environmental Management Division. If, after atmospheric testing of the work area, conditions change, re-evaluation of the RPE is required.

ATTACHMENT B

STANDARD OPERATING PROCEDURE FOR QUALITATIVE RESPIRATOR FIT-TESTING: ISOAMYL ACETATE FIELD TEST - PLASTIC BAG ENCLOSURE

1. Facepieces equipped with organic vapor cartridges will be used for this test.

2. A tissue or cloth is saturated with isoamyl acetate and suspended inside the top of the bag or hood.

3. The test subject will don the respirator and a visual inspection of the facepiece-to-face seal shall be made by the tester. An obvious leak in the facepiece-to-face seal shall be reason to abort the test and record that size mask unsatisfactory. Expression of discomfort created by the mask shall also be reason to abort the test.

4. The test subject will perform an inhalation and exhalation valve fit check as explained in Attachment A.

5. The test subject shall be instructed to enter the bag or hood and breathe normally during a short sedentary period (20-60 seconds). If no leakage is detected by the subject during the sedentary period, the subject shall be instructed to perform various exercises simulating, as near as possible, his/her work conditions (i.e., talking, running in place, head movements, bending over, etc.). Leakage at any time shall be cause to terminate the test.

6. Detection of the odor by the test subject during fitting, indicates a failure of that respirator. If leakage is detected, the subject shall be removed from the test atmosphere and the facepiece-to-face seal visually inspected for obvious leakage. If any doubt about the condition of the facepiece or the cartridges exist, another respirator shall be tested to assure the leakage was due to facepiece-to-face seal.

STANDARD OPERATING PROCEDURE FOR QUANTITATIVE RESPIRATOR FIT TESTING PORTA COUNT PARTICLE COUNTING INSTRUMENT

1. Facepieces equipped with high efficiency particulate air (HEPA) cartridges will be used for this test.

2. The test subject will don the respirator and a visual inspection of the facepiece-to-face seal shall be made by the tester. An obvious leak in the facepiece-to-face seal shall be reason to abort the test and record that size mask as unsatisfactory. Expression of discomfort created by the mask shall also be reason to abort the test.

3. The test subject will perform a prescribed number of exercises as requested by the fit tester which shall include deep and normal breathing, head movements, grimacing, jogging, touching toes and the vocalizing of the rainbow passage. The fit tester shall prescribe the required amount of time for each exercise.

4. A fit factor will be attained which is a ratio between the airborne particulate concentrations of the room air and the filtered air inside the mask. Fit factors which are not at least 10 times greater than the assigned protection factor for a negative pressure half or full face respirator shall fail the test. If a failed test occurs, another size respirator shall be donned by the test subject and the entire procedure repeated until a passing fit is recorded.

ATTACHMENT C
STANDARD OPERATING PROCEDURE
DISASSEMBLY, CLEANING AND MAINTENANCE OF RESPIRATORS

1. Remove the cartridges and all gaskets that are not affixed to seats.

2. Visually inspect facepiece and parts. Discard faulty items.

3. Remove all elastic headbands.

4. Remove exhalation valve cover.

5. Remove speaking diaphragm or speaking diaphragms-exhalation valve assembly or pressure-demand exhalation valve assembly.

6. Remove inhalation valves.

7. Wash, rinse and sanitize facepiece. (Maximum water temperature 140°F optimum range 120° to 140°F). Parts removed from respirators may be washed separately as necessary.

8. Air dry masks.

9. Hand wipe facepiece, valves and valve seats with a damp cloth to remove any soap or water residues, mold release powders or foreign materials not removed by washing.

10. Disassemble and hand clean the pressure-demand and exhalation valve assembly, exercising care to avoid damage to the rubber diaphragm.

11. Visually inspect the facepiece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator.

12. Replace any questionable or obviously faulty parts or assemblies including rubber components that show wear by checking when flexed or stretched, distorting the facepiece. Replace only with parts specifically designed for the particular respirator.

13. Reassemble mask and visually inspect completed assembly.

14. Install new or retested filters or cartridges.

15. Clean and apply fogproof to lens as per the manufacturers' instructions (full facepieces only).

16. Install outside lens cover (full-facepieces only).

17. Seal each mask in a plastic bag.

ATTACHMENT D

CHECKLIST FOR INSPECTION OF DEMAND OR POSITIVE PRESSURE DEMAND OPEN CIRCUIT SELF CONTAINED BREATHING APPARATUS 2.5 WITH MODE SELECT LEVER:

PRIOR TO BEGINNING INSPECTION:

1. Check to assure that high pressure hose connect is tight on cylinder fitting.

2. Check the bypass valve - it should be closed.

3. Make sure the mainline valve is open and locked (when lock present).

4. Place the select lever (if present) on demand mode.

5. Check to assure there is no cover or obstruction on regulator outlet.

I. BACK PACK AND HARNESS ASSEMBLY

A. Straps

1. Visually inspect for complete set.

2. Visually inspect for frayed or damaged straps that may break during use.

B. Buckles

1. Visually inspect for mating ends.

2. Check locking function.

C. Backplate and Cylinder Lock

1. Visually inspect backplate for cracks and for missing rivets or screws.

2. Visually inspect cylinder hold down strap and physically check strap adjustments and lock to assure that it is fully engaged.

II. CYLINDER AND CYLINDER VALVE ASSEMBLY

A. Cylinder

1. Physically check cylinder to assure that it is tightly fastened to back plate.

2. Check Hydrostatic Test Date to assure it is current.

3. Visually inspect cylinder for large dents or gouges in metal.

B. Head and Valve Assembly

1. Visually inspect cylinder valve lock for pressure.

2. Visually inspect cylinders gauge for condition of face, needle, and lens.

3. Open cylinder valve and listen or feel for leakage around packing. (If leakage is noted, do not use until repaired.) Note function of valve lock.

III. REGULATOR AND HIGH PRESSURE HOSE

A. High Pressure Hose and Connector

1. Listen or feel for leakage in hose or at hose to cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily mean a faulty hose.)

2. Visually inspect condition of hose for drying, cracking or gashes.

B. Regulator and Low Pressure Alarm

1. Read pressure on regulator gauge. (Must read at least 1800 psi and not more than rated cylinder pressure.)

2. Close cylinder valve. Ascertain that no obstruction is in or over regulator outlet. Position regulator to observe regulator gauge. Slowly open bypass valve. Air should flow from outlet, and gauge pressure should begin to decrease immediately. Alarm should sound at pressure reading between 650 and 550 psi. (This assures function of bypass valve and low pressure alarm.) After pressure is completely released, close bypass valve.

3. Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5-10 seconds without any loss of air. Next, create a slight negative pressure on regulator and hold for 5-10

seconds. Vacuum should remain constant. This tests the integrity of the diaphragm. Any loss of pressure or vacuum during the test indicates a leak in the apparatus.

4. Open the cylinder valve.

5. Breathe in using the regulator. Air should be delivered with very slight effort.

6. On units with select lever, place hand over regulator outlet. Select pressure demand mode. Remove and replace hand over outlet in rapid movement. Repeat twice more. Air should escape when hand is removed each time, indicating a positive pressure in chamber. Select demand mode on select lever and remove hand from outlet. At this point, there should be no air leaking from any point on the pressurized unit.

IV. FACEPIECE AND CORRUGATED BREATHING TUBE

A. Facepiece

1. Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion.

2. Visually inspect the lens for a proper seal in the rubber facepiece, check to see that the retaining clamp is properly in place, and check lens face for cracks, or large scratches.

3. Visually inspect exhalation valve for visible deterioration or build-up of foreign materials.

B. Breathing Tube and Connector

1. Stretch breathing tube and visually inspect for deterioration and holes.

2. Visually inspect connector to assure good condition of threads and for presence and proper condition of O ring or rubber gasket seal.

NOTE: The final test of a facepiece involves a negative-pressure test for overall seal and check of the exhalation valve. When performing a monthly inspection, place the mask against the face and perform the following test. If preparing for use, don the backpack, then the facepiece and use the following procedure.

C. Negative-Pressure Test on facepiece

1. With facepiece held tightly to face or properly donned, stretch breathing tube to open corrugations and place thumb or hand over end of connector. Inhale. Negative pressure should be created inside_mask, causing it to pull tightly to face. This negative pressure should be maintained for 5-10 seconds. If negative pressure is not maintained, the facepiece assembly is not adequate and should not be worn.

NOTE: **On Scott Pressure-Pak II and IIA facepiece units only, place connector end of the breathing tube approximately 1/4-1/2 inch from palm of hand and exhale. If you notice any air returning through tube, the mask should not be used.**

V. STORAGE OF UNITS

1. Replace the cylinder and clean and inspect the unit after each use.

2. Check to see that the cylinder valve is closed.

3. Make sure the high pressure hose connector is tight on the cylinder.

4. Bleed the pressure from the high pressure hose and regulator.

5. Make sure the bypass valve is closed.

6. Make sure the mainline valve is open (When mainline valve lock is present, it should be engaged.)

7. Place the select lever, if present, on demand mode.

8. Check to make sure all straps are completely loosened and laid straight.

9. Make sure the facepiece is properly stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.

NOTE: **Any discrepancy should be cause to set the unit aside until repair can be performed by a certified repair person.**

ATTACHMENT E

CHECKLIST FOR INSPECTION OF PRESSURE DEMAND OPEN CIRCUIT SELF-CONTAINED BREATHING APPARATUS 4.5 WITH DONNING SWITCH:

PRIOR TO BEGINNING INSPECTION:

Check to assure that high pressure hose connect is tight on cylinder fitting.

I. BACK PACK AND HARNESS ASSEMBLY

A. Straps

1. Visually inspect for complete set.

2. Visually inspect for frayed or damaged straps that may break during use.

B. Buckles

1. Visually inspect for mating ends.

2. Check locking function.

C. Backplate and Cylinder Lock

1. Visually inspect backplate for cracks and missing rivets or screws.

2. Visually inspect cylinder hold down strap and physically check strap tightener and lock to assure that it is fully engaged.

II. CYLINDER AND CYLINDER VALVE ASSEMBLY

A. Cylinder

1. Physically check cylinder to assure that it is tightly fastened to backplate.

2. Check Hydrostatic Test Date to assure it is current. (Within 3 years for composite lightveight cylinders.)

3. Visually inspect cylinder for large dents or gouges in metal.

B. Head and Valve Assembly

1. Visually inspect cylinder valve lock for pressure.

2. Visually inspect cylinder gauge for condition of face, needle, and lens.

III. CYLINDER PRESSURE GAUGE - VIBRALERT ALARM

A. Donning SCBA

1. Check the cylinder pressure gauge for "FULL" indication. If indicated cylinder pressure is below "FULL", recharge cylinder to 4500 psi or replace with a fully charged cylinder.

2. Check the latest cylinder hydrostatic test date to ensure it is current.

W A R N I N G

CYLINDERS WHICH SHOW EVIDENCE OF EXPOSURE TO HIGH HEAT OR FLAME, SUCH AS PAINT TURNED BROWN OR BLACK, DECALS CHARRED OR MISSING, GAUGE LENS MELTED OR ELASTOMERIC BUMPER DISTORTED, SHALL BE REMOVED FROM SERVICE AND RETESTED PRIOR TO RECHARGING.

3. Check that the breathing regulator purge valve (red knob on regulator) is closed (full clockwise and pointer on knob upward).

C A U T I O N

DO NOT USE TOOLS TO OPEN OR CLOSE THE PURGE VALVE. CLOSE OR OPEN FINGER-TIGHT ONLY. ROTATION OF THE PURGE VALVE KNOB LIMITED TO 1/2 TURN.

4. Fully depress the center of the donning switch on the top of the regulator and release.

5. Slowly open the cylinder valve by rotating knob counterclockwise. Listen for Vibralert alarm to actuate and then stop. There shall be no airflow from the facepiece.

6. Don the facepiece or hold the facepiece to the face to effect a good seal.

7. Inhale sharply to automatically start the flow of air.

8. Breathe normally from the facepiece to ensure proper operation.

B. Removing (Doffing) SCBA

9. Remove facepiece from face. Air shall freely flow from the facepiece.

10. Fully depress center of the donning switch on top of regulator and release. The flow of air from the facepiece shall stop.

11. Rotate purge valve 1/2 turn counterclockwise (pointer on

knob downward). Air shall freely flow from the regulator.

12. Rotate purge valve 1/2 turn clockwise to fully closed position (pointer on knob upward). Airflow from regulator must stop.

13. Push in and rotate cylinder valve knob clockwise to close. When cylinder valve is fully closed, open purge valve slightly to vent residual air pressure from system. The Vibralert will actuate as the pressure drops below 1200 psi. When airflow stops, return purge valve to fully closed position (pointer on knob upward).

14. After checking, unit should be placed back into case or valk away bracket, ready for use, with all straps fully extended, cylinder full, purge valve closed and head harness turned back over facepiece.

W A R N I N G

FOLLOW THE ABOVE PROCEDURE EXACTLY. IF THE VIBRALERT ALARM DOES NOT ACTUATE, THE PURGE VALVE DOES NOT ACTUATE, THE DONNING SWITCH DOES NOT OPERATE AS DESCRIBED OR ANY OTHER OPERATIONAL MALFUNCTION IS NOTED, REMOVE THE APPARATUS FROM SERVICE AND TAG FOR REPAIRS.

IV. FACEPIECE AND CORRUGATED BREATHING TUBE

A. Facepiece

1. Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion.

2. Visually inspect lens for proper seal in rubber facepiece, retaining clamp properly in place, for cracks, or large scratches.

V. STORAGE OF UNITS

1. Replace the cylinder and clean and inspect the unit after each use.

2. After replacing, make sure the cylinder valve is closed.

3. Make sure the pressure hose connector is tight on the cylinder.

4. Check to see that the pressure has been bled off of high pressure hose and regulator.

5. Adjust all straps so that they are completely loosened and laid straight.

6. When storing make sure to protect the facepiece against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.

NOTE: **Any discrepancy found should be cause to set the unit aside until repair can be performed by a certified repair person.**

4

Cardinal

OPERATIONS AND MAINTENANCE PROGRAM

The Port Authority of NY & NJ

TRAINING MANUAL

Hygienetics Training Institute
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What is Asbestos?

The term "asbestos" refers to several types of naturally occurring fibrous minerals which have similar chemical and physical properties. The types can be separated into two groups: serpentine and amphibole. In the first group we find only chrysotile, and in the latter, crocidolite, amosite, actinolite, tremolite, and anthophyllite. The work "asbestos" can be traced back to the Greek word for "unquenchable" or "inextinguishable", referring to its non-flammability.

All six types of asbestos share several common properties: relatively high tensile strength; chemical and heat resistance; electric, noise and thermal insulation; non-flammability; and the tendency to split into smaller and smaller fibers when handled. Nonetheless, each type possesses the above characteristics in varying amounts as well as possessing other individual characteristics which make each more appropriate for specific uses.

Chrysotile, commonly called white asbestos, consists of hollow, flexible, cylindrical fibrils wound spirally into a fiber with curled, split ends. Its chemical formula is generally $Mg_3Si_2O_5(OH)_4$. Chrysotile varies in color between green, grey, amber, and white, has a very high tensile strength, and is very easily spun into woven fabric. Amphibole fibers have larger diameters, are harder, flatter, straighter, more resistant to acids and heat, and generally have lower tensile strengths than chrysotile. Amphiboles tend to have the formula $(Ca,Na,Mn)_2$-$_3(Mg,Fe,Ti,Al,Mn)_5(Si, Al)_8O_{22}(OH,F)_2$. Blue crocidolite is unusually similar in its physical properties to chrysotile except for its higher resistance to acids. Amosite, also called brown asbestos and named from the acronym A(sbestos) M(ines) O(f) S(outh Africa), may be grey, yellow, or brown and has good flexibility. Actinolite, tremolite, and anthophyllite exist in asbestos and non-asbestos (fibrous and non-fibrous) forms, and although they are regulated by OSHA standards, they play a relatively minor role commercially.

Geographical Location and Geological Formation

Asbestos is found in nearly every country in the world. Although chrysotile is not a common mineral, its mining is simplified because it is found in "large scale deposits". It is mined mostly in Canada, the USSR, and the USA. Amphiboles are more common but rarely occur in deposits large enough to be utilized economically. Crocidolite and amosite are mined primarily in South Africa.

Chrysotile is formed in fissures in serpentine rocks as a result of water dissolving the rock. On the other hand, the amphiboles crocidolite and amosite form in sedimentary rocks as

a result of heat and pressure. The rocks are transported to a mill, usually adjacent to the mine. In the mill, the fibrous asbestos is separated from the rock, purified, and packaged for shipping to various industries. The remaining rock, "tailings" contain small amounts of asbestos and have been used as road building or road surfacing materials.

Uses of Asbestos

The oldest use of asbestos appears to be in pottery in Stone Age Africa and in Finland ca. 2500 B.C. Here we see for the first time that the uses of asbestos do not always entail utilizing its special properties. Often, as is probable in this case, asbestos is used simply because it is an abundant resource that may occur naturally in the materials used.

The first documented use of asbestos, during the first century B.C., was in "perpetual" wicks of oil burning lamps. Asbestos was also woven into funeral cloth for cremation. Anecdotes tell of Emperor Charlemagne putting an asbestos table cloth in a fire and retrieving it undamaged, thereby convincing hostile dinner guests that he had magical powers. Marco Polo encountered asbestos in his travels in Siberia under the name "salamander's wool", and Benjamin Franklin's salamander's wool purse, sold to an Englishman, was placed in the British museum in 1753. Asbestos soon found other uses, especially in paper; Pope Pius IV produced asbestos paper ca. 1830 so papal documents could not be destroyed by fire. Finally, with the coming of the industrial revolution, recently discovered asbestos deposits and a variety of new uses formed a strong supply and demand relationship.

More recently, asbestos has been used in

fire-proofing materials--sprayed-on building structures or woven in theater curtains, firemen's clothes, welders' blankets

thermal insulation--around pipes, ducts and boilers, in pot holders and chemists gloves, as spray-on materials

acoustical insulation--both sprayed on cars and buildings and contained in ceiling tiles

electrical insulation

reinforcing material--in asbestos cement (transite, roofing panels, asbestos shingles, and water pipes), floor tiles, paint, caulk, patching compounds, decorative plaster and stucco, and asphalt

friction materials--brake linings and clutch facings

Filters--for food, beverages, chemical processes, especially involving acids, gas masks in World War II, even to filter air pollutants or dust in HVAC systems.

Asbestos has also been used in wrappers of tobacco products, fake fireplace logs, hair dryers, and children's modelling clay. Asbestos has also been found in products where its presence was not planned, such as in children's sand box sand and talc used for talcum power and baby powder.

The uses we must be most concerned with are in friable materials. Friable means that the material can be crumbled, flaked, or powdered easily by hand pressure releasing fibers into the air. This does not imply that non-friable asbestos-containing substances are not hazardous (non-friable materials such as asbestos-containing vinyl floor tiles can be made to release fibers), but only that friable materials are more hazardous.

Opportunities for Exposure to Airborne Asbestos

Even disregarding the presence of asbestos in air due to the natural erosion of asbestos rock formations, there are many opportunities for exposure to asbestos which can be divided into occupational and non-occupational types. Distinguishing between the two is difficult but important because only occupational exposures are regulated. We can assume that everybody, at some time or another, is exposed to asbestos.

People undergo exposure in their homes, usually because of friable insulation material around pipes or boilers; but occasionally, during repair, renovation or demolition, someone will damage non-friable asbestos-containing materials such as vinyl floor tiles, asbestos shingles, or roofing materials, thereby releasing otherwise bound fibers into the air.

Children and teachers are exposed to airborne fibers in some schools constructed with asbestos-containing insulation materials and from continued use of items from earlier years, such as modelling clay that may still contain asbestos. People are exposed to asbestos from the wear of brake and clutch linings on cars, and of course mechanics are also exposed during brake and clutch repairs. Residents of urban areas are exposed to higher levels of airborne asbestos than those in rural areas, due to industrial use of asbestos and higher automobile traffic.

Many people receive exposure in office and factory buildings, especially through HVAC systems insulated with asbestos-containing material. Maintenance workers in asbestos-containing buildings may also be exposed to asbestos during their routine activities. Construction workers, plumbers,

electricians, phone company employees, HVAC workers, fire fighters and others probably encounter asbestos constantly in their work without knowing it.

Studies performed in the past have demonstrated that asbestos textile and insulation workers brought asbestos home on their clothing, exposing their families to asbestos, and that this exposure led to asbestos-related diseases. What about workers such as plumbers, who may occasionally be exposed to low concentrations of asbestos? Surely, if they do not perform the work safely and use proper personal hygiene procedures, they may bring asbestos fibers home with them also.

How has this dangerous mineral achieved such widespread use? Other materials could have been used, but the combination of the chemical and physical properties of asbestos along with its abundance and relative low cost has made it the material of choice for certain applications for over one hundred years. Indeed, the industry that grew and prospered because of asbestos has always looked for new and innovative ways to use its product. Recently, however, the United States Environmental Protection Agency promulgated a regulation to ban almost all asbestos use in the U.S. within seven years. This ban clearly demonstrates the present awareness of the dangers of asbestos.

Health Effects of Asbestos

Asbestos-related diseases typically involve long latency periods--the exposure to the agent and manifestation of effects may be separated by as many as 10-40 years. This was one of the major factors that hindered associating asbestos exposure with such crippling and fatal diseases as asbestosis, lung cancer, mesothelioma, and several other forms of cancer.

Asbestosis: Asbestosis is a non-cancerous respiratory disease. It is basically a progressive scarring of the lung tissue which inhibits, and may eventually prevent, the exchange of gases between air and blood. As microscopic fibers are inhaled and deposited in alveoli (air sacs), irritation occurs. Natural body defense mechanisms called macrophages attempt to surround, isolate, and dissolve asbestos fibers to prevent damage to the lungs. However, because of the resistant nature of asbestos, the macrophages cannot break down the fibers. The macrophages die, forming scar tissue. Research has shown that asbestosis is associated with long term exposure to relatively high concentrations of airborne asbestos.

Pleural Plaques:	This is the most common form of non-cancerous pleural disease related to asbestos. Plaques are small calcifications on the lining of the lung cavity. There may be no physical symptoms, however, the plaques may lead to breathing impairment.
Pleural Thickening:	When the lining of the lung cavity thickens, breathing may become impaired.
Pleural Effusion:	This disease is characterized by an accumulation of fluids in the lung cavity.
Lung Cancer:	Inhaled asbestos fibers can penetrate cell membranes in the lung, altering normal cell functions including growth and division. This may result in the uncontrolled cell growth called cancer. Because smoking defeats the lungs' cleaning mechanisms, cilia, smokers who are exposed to asbestos may have a higher risk of lung cancer than non-smokers exposed to asbestos. In fact, their risk of getting cancer may be as much as 92 times greater. Apparently, smoking suppresses the cilia's waving action which normally sweeps foreign particles from the lungs. When this defense mechanism fails, fibers can proceed to lower lung areas. Health experts strongly recommend that you quit smoking if you have a potential for exposure to asbestos.
Mesothelioma:	The most serious of all asbestos-related illnesses is mesothelioma, a rare cancerous tumor. Mesothelioma may develop on the protective lining of the lungs (pleural) or abdomen (peritoneum). Mesotheolioma is virtually exclusive to asbestos exposure. Research indicates that even minor exposures for short periods of time may cause mesothelioma. There is no treatment for mesothelioma and the disease is almost always fatal. Most patients die within eighteen months of diagnosis and few live past five years more.
Other Cancers:	Asbestos fibers apparently can migrate from the lungs to other areas of the body. Asbestos has been linked to cancer of the larynx, esophagus, gastro-intestinal tract, and rectum.

Presently, there is little disagreement as to the serious health hazards of exposure to airborne asbestos. Instead, significant modern debates revolve around such issues as dose-response relationships (how much asbestos is dangerous?) and the significance of the type of asbestos or fiber size (what type or size of fiber is most dangerous?). Why are these issues important? Clearly the determination of which asbestos fibers at what levels are or are not dangerous would be significant in the regulation process. In addition, the answers would aid in the development of "safe" substitutes.

Although the debates still continue regarding the levels and types of asbestos which are hazardous, there are very few who would today argue that asbestos is safe.

Regulation of Asbestos

The regulation of asbestos has an interesting history because it demonstrates a progressive increase in knowledge leading to a decreasing exposure standard. The regulation process demonstrates many of the forces involved in environmental issues because it is largely a process of negotiations, including debates over scientific proof and risk- and cost-benefit analyses.

One of the difficulties involved in understanding the regulation of asbestos is that there are so many agencies involved. The following is a brief summary of applicable regulations by each of the agencies significant to your work--U.S. Occupational Safety and Health Administration (OSHA), the U.S. Environmental Protection Agency (EPA), and state and/or local agencies.

OSHA - The Occupational Safety and Health Act of 1970 established the Occupational Safety and Health Administration (OSHA) under the Department of Labor. OSHA is responsible for regulating asbestos exposure in the work place, including removal projects.

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules (General Industry Standard (29 CFR 1900.1001) and Construction Industry Standard (29 CFR 1926.58)). The OSHA asbestos regulations ,enacted in June 1986, apply mainly to work places where asbestos-containing products are manufactured or encountered in construction, renovation, or demolition activities. However, the regulations can also apply to any workers who may reasonably be expected to be exposed to asbestos in the course of their normal work activities.

The OSHA regulations established two airborne standards for asbestos exposure.

1) At the Action Level of 0.1 fibers/cubic centimeter (f/cc) an employer must offer medical surveillance programs, provide training and education, and perform air monitoring.

2) At the Permissable Exposure Limit (PEL) of 0.2 f/cc an employer must implement all the above programs for the Action Level and must regulate the area. A regulated area involves, among other things, engineering controls to minimize airborne concentrations, respiratory and other personal protective equipment, and personal hygiene practices including decontamination procedures.

3) At the Excursion Limit (EL) of 1.0 f/cc, the same requirements as for the PEL apply. This air standard is designed to protect workers who may be exposed to asbestos only for short bursts of high concentrations. Such workers include building maintenance workers and automotive brake repairmen.

The OSHA Construction Standard, also included a section (29 CFR 1926.58 Appendix G) on small-scale, short-duration projects. The Appendix provides guidelines to minimize airborne concentrations of asbestos so that the more stringent work procedures outlined in the main body of the regulation can be avoided for smaller jobs. This appendix requires that employers develop written safe work polices and procedures and train workers in these procedures and the use of personal protective equipment.

Hazard Communication Standard - This regulation protects workers by preempting all state and local Right-to-Know regulations and standardizes all Right-to-Know laws and material safety data sheets. Right-to-Know laws apply to any worker who may encounter hazardous materials in the work place. The law gives him the right to request information and training regarding these hazardous substances including topics such as health effects, safety precaution, and personal protective equipment.

EPA - Government regulation of asbestos in this country began with the birth of the Environmental Protection Agency which named asbestos as a hazardous air pollutant in 1971.

NESHAPs - National Emission Standards for Hazardous Air Pollutants of 1973 under the Clean Air Act regulates construction and waste disposal methods involving asbestos. In particular, it requires that there be no "visible" emissions of asbestos to the atmosphere and that the EPA must be notified before any renovation or demolition begins involving asbestos removal.

Worker Protection Rule - This regulation is practically equivalent to the OSHA asbestos regulations and applies to all workers not covered under those regulations. One main difference, however, is that the EPA rule has notification requirements.

AHERA - The Asbestos Hazard Emergency Response Act was passed by the two houses of Congress and signed by President Reagan in 1986. Part of this legislation mandated the EPA to develop regulations governing identification, evaluation, and control of asbestos-containing building materials in public and private primary and secondary schools. In October 1987, the EPA published Asbestos-in Schools; Final Rule and Notice which requires Local Educational Agencies to:

1) Conduct inspections to identify all locations of friable and non-friable asbestos-containing building materials

2) Develop asbestos management plans for any required periodic surveillance, reinspections, and response (i.e., abatement) actions.

3) Design and conduct response actions sufficient to protect human health and the environment. Response actions may include repair, encapsulation, enclosure, and removal of asbestos-containing building materials.

AHERA - Requires that each state develop an accreditation program for training and certification of all individuals performing asbestos-related work in schools (i.e., inspectors, management planners, project designers, abatement workers, contractors/supervisors).

In addition, AHERA mandates that an operations and maintenance (O&M) program be established in any school constructed with asbestos-containing building materials. This section of the regulation is based on Appendix G of 29 CFR 1926.58 and spells out specific training requirements.

NEW YORK - New York State has issued regulations which apply to work procedures, training and certification requirements, transport and disposal.

Title 12 Part 56 - Last amended in December 1987, this regulation from the NY Department of Labor spells out requirements for

1) licensing and certification
2) notification and recordkeeping
3) work area entry and exit procedures
4) equipment and waste decontamination procedures
5) engineering controls
6) construction and isolation of work area
7) construction of waste and personnel decontamination facilities
8) handling, removal, encapsulation, and enclosure procedures
9) clean-up and repair procedures
10) air sampling and analysis

The regulation includes in its scope all asbestos projects in any building. Significant aspects of the regulation that you should be aware of include

1) Classification of abatement projects into 3 categories

   a) minor projects - less than or equal to 25 LF or 10 SF of friable ACM
   b) small projects - greater than 25 LF but less than 260 LF or greater than 10 SF but less than 160 SF of friable ACM
   c) large projects - greater than 260 LF or 160 SF of friable ACM

2) Certification/Licensing -

   a) All contractors engaged in asbestos work must be licensed to do so
   b) Handlers (workers) require certification
   c) Supervisors require certification
   d) Restricted Handler I (Allied Trades) - workers who may be involved in preparing an area for abatement require certification
   e) Restricted Handler II (Asbestos Project Sampling Technician) - workers who may be involved in air sampling during an abatement activity require certification

   NOTE: At this time there are no specific certification requirements for inspectors, management planners, or O&M workers.

3) Work area preparation - for minor projects, the following step is required:

   a) restrict access by evacuating the area and posting signs or barricades at the only entrance/exit

4) Clean-up procedures - only if and when the engineering controls being used for a minor project fail (for example, a glove bag splits open at the bottom), the following steps are required:

   a) isolate the area by creating a containment and shutting down and sealing the HVAC system
   b) create a negative air system
   c) thoroughly clean the area, twice
   d) conduct clean air testing

Title 10 Part 73 - Last amended in December 1988, this regulation from the NY Department of Health spells out training requirements for persons involved with asbestos projects. There are specific training requirements for all disciplines which require certification in NY (see 2 b-e above) and O&M workers. The O&M training requirements is a two-day course modeled after AHERA requirements.

New York state has several other regulations which involve asbestos. The Department of Education's School Asbestos Safety Act (SASA) is an AHERA-approved program. The state's Department of Environmental Conservation regulates transport, disposal, and other NESHAPs issues.

NEW JERSEY-New Jersey has issued regulations which apply to the work procedures, training and certification requirements, transport and disposal.

Subchapter 8, Asbestos Hazard Abatement Subcode - Last amended in December 1987, this regulation from the NJ Department of Community Affairs spells out requirements for asbestos-related work in all buildings. It also gives the Department, and its authorized agents, the power to enforce regulations from other state departments.

1) Classification of abatement projects into 3 categories:

a) minor projects - less than or equal to 25 LF or 10 SF of friable ACM within one year
b) small projects - greater than 25 LF but less than 260 LF or greater than 10 SF but less than 160 SF of friable ACM within one year
c) large projects - greater than 260 LF or 160 SF of friable ACM within one year

2) Agents authorized to enforce Subchapter 8 regulations:

a) Asbestos Safety Control Monitor (ASCM) - consulting firm licensed by the DCA
b) Asbestos Safety Technician (AST) - project monitor, employed by ASCM, and authorized by DCA to stop work when necessary. The AST is not only "authorized" to enforce the regulations, but he/she is required by law to enforce them.

3) Training for O&M workers - the DCA requires training similar to AHERA for these workers who perform minor projects. There are no certification requirements

4) Documentation/recordkeeping - Subchapter 8 requires documentation and notification for each minor project. The records must include:

a) location of worksite
b) type of abatement work
c) scope of work
d) replacement materials
f) date of work
g) names and addresses of workers
h) disposal site

5) Work in occupied buildings - all asbestos projects in NJ must be performed in unoccupied buildings, unless

a) a waiver is obtained from the appropriate agency claiming that the work area will be adequately isolated from the occupied areas of the building, or
b) the project is a minor project

6) Requirements following encapsulation or enclosure:

a) O&M program
b) Records documenting location of ACM
c) Labelling (may involve signs, labels, or color coding)

7) Glove bag requirements:

a) clean air test after glove bag operations only when they are part of a small or large project

Other New Jersey agencies which regulate asbestos include the Department of Environmental Protection (EPA NESHAPs and DOT), the Department of Labor (licenses and permits), and the Department of Health (training).

NEW YORK CITY - New York City has issued regulations which apply to the work procedures, training and certification requirements, transport and disposal.

Local Law 76 - Last amended in November 1988, this regulation from the NYC Department of Environmental Protection applies to any asbestos abatement activity in buildings (There are special requirements for certain health care facilities and for renovation and demolition activities).

1) Inspection, Management Plans, and/or Project Design - Inspections (or investigation) are required prior to receiving a permit to perform renovation or demolition activities. The inspections result in producing an "Asbestos Project" or "Not An Asbestos Project" notification form. Inspections must be performed by trained and NYC-certified asbestos investigators.

2) Abatement - Abatement is required to prevent the release of fibers during demolition or renovation activities. Abatement work must be performed by trained and certified handlers and supervisors. The regulations define three (3) classes of asbestos projects:

a) Minor = less than or equal to 25 LF or 10 SF of friable ACM
b) Small = greater than 25 LF but less than 260 LF or greater than 10 SF but less than 160 SF of friable ACM
c) Large = greater than 260 LF or 160 SF of friable ACM

NOTE: There are no specific work requirements or regulations for small-scale, short duration (i.e., O&M) activities.

3) Project Monitoring - Third party project monitors are required to perform air monitoring throughout the abatement project. No other "project monitoring" responsibilities are spelled out in the regs. There are no specific training or certification requirements for these individuals.

4) Training and certification

   a) handlers
   b) supervisors
   c) investigators (inspectors)

5) Worker Protection - the regulations specify respiratory requirements stricter than OSHA's.

6) Pending Regulations - The DEP is expecting new regulations for inspecting all public access buildings and for O&M activities.

Other New York City agencies which regulate asbestos include the Department of Sanitation, which regulates the transport and disposal of asbestos-containing waste in NYC.?

Air and Bulk Sampling

Air monitoring is performed for the following purposes:

1) To assess airborne asbestos levels in buildings under normal, background conditions

2) To comply with asbestos regulations and to determine respiratory protection requirements (personal sampling)

3) To verify that airborne asbestos fibers do not escape from a sealed removal area (area sampling)

4) To verify that a removal area is safe for re-occupancy (final clearance sampling)

There are a number of air sample analysis methods including the following:

1) Phase Contrast Microscopy (PCM)

2) Scanning Electron Microscopy (SEM)

3) Transmission Electron Microscopy (TEM)

4) Fibrous Aerosol Monitor (FAM)

Bulk samples identify asbestos-containing materials in buildings. All materials suspected of containing asbestos should be sampled and tested by an experienced laboratory using polarized light microscopy (PLM). The results of bulk sample analysis, in addition to condition assessments, form the basis for choosing and designing abatement activities.

Respirators

Respiratory protection equipment is used to prevent inhalation of hazardous airborne substances and whenever an atmosphere may be deficient in oxygen. Hazardous airborne substances include gases, mists, aerosols and dusts - or particulate matter such as asbestos. Respirators can be classified into one of the following three general types:

- Passive air purifying or negative pressure air purifying;
- Powered air purifying, or positive pressure air purifying; and
- Supplied air.

Each of these three can use a "half" (i.e., mouth and nose), "full" (i.e., mouth, nose, and eyes), or hood type of facepiece. The following is a brief description of each general type of respirator.

Passive air purifying respirators rely upon the ability of a person's lungs to draw air through an air filtering media that removes the airborne contaminant either by mechanical filtration or chemical reaction. The air filtering media must be capable of completely capturing or reacting with the specific contaminant(s), and the person's lungs must be capable of drawing sufficient air through the media for prolonged periods of time. In addition, the air must have the proper amount of oxygen for human respiration and must not contain any other contaminants that would not be removed by the filtering media. This type of respirator also heavily relies upon a face-to-facepiece seal which can cause the respirator to leak if not completely tight. Each respirator facepiece must therefore be custom fit-tested (qualitatively and/or quantitatively) for each person, and then constantly checked for leakage during use.

Powered air purifying respirators (PAPRs) are an improvement to passive respirators because they have a small battery-powered

fan or blower which draws contaminated air through the filtering media and delivers clean air to the facepiece, thereby creating a positive pressure. This pressure greatly reduces stress on the person's lungs and the risks of leakage at the face-to-facepiece seal points. PAPRs must have an air flow of at least four cubic feet per minute. PAPRs use various specific replaceable cartridges similar to those used in the passive filtering respirators.

Supplied air respirators (SA) rely upon an independent source of known "clean" air and have a positive pressure facepiece which eliminates stress on a person's lungs and the risk of inward leakage. The source of air is either a compressor (connected to the respirator with variable lengths of air hose) or a small portable pressurized tank as used by scuba divers. The former is called "Type C" supplied air. The latter is known as a self-contained breathing apparatus (SCBA) and is available with tanks that supply from 5 minutes to several hours of air.

Since the source of supplied air can generally be certified "clean", supplied air respirators offer the best protection against inhalation of the air contaminant. Their use may also be mandatory where the work environment's atmosphere does not have sufficient oxygen and/or has too many (or unknown) air contaminants to ensure the effectiveness of filtering media.

Fit-testing:

The effectiveness of a respirator's fit is fundamental to its performance, especially for passive air purifying respirators. Either minor continuous leakage or a single leakage event can result in significant exposure. The fit of a respirator's facepiece can be tested either quantitatively or qualitatively.

Quantitative testing involves using a challenge agent (contaminant) and carefully measuring its concentration inside the facepiece versus outside the facepiece in a special test chamber. (This testing is also used to calculate the respirator's "protection factor".) Qualitative testing involves protocols using irritant smoke, saccharin, or banana oil to challenge the fit.

Each employee must be individually fit-tested for an acceptable passive air purifying respirator. This fit-testing must be repeated semi-annually. Employees who cannot be effectively fit-tested for a respirator but who have medical approval to wear a respirator should be provided a powered air purifying respirator, which does not require fit-testing.

Operations and Maintenance Programs

Whenever a building contains asbestos and removal is not performed, an Operations and Maintenance (O&M) Program should be established. The components of an O&M program include, education, training, medical surveillance and respiratory equipment, periodic surveillance, documentation and respiratory protection programs. O&M programs are designed to fulfill the following goals:

1) Clean up asbestos debris that has already been released,

2) Prevent future fiber release by developing safe work policies and procedures, and

3) Monitor the condition of asbestos-containing materials.

These goals may be achieved through setting up a program which carefully distinguishes those tasks which may be performed as part of an O&M program. Such tasks include, but are not limited to, removal of small amounts of asbestos-containing gaskets, and performing tasks above a suspended ceiling. In general, O&M tasks can be characterized in two ways: 1) job activities which do not have asbestos abatement as their goal but must disturb asbestos-containing materials (e.g., emergency pipe repairs and removing a small amount of sprayed-on asbestos from a ceiling in order to hang a pipe), or 2) minor abatement activities to prevent exposure to building occupants (e.g., clean-up of asbestos debris or patching a damaged pipe covering).

Because the potential hazards of asbestos exposure are directly related to the condition of the ACM, the importance of the O&M program is self-evident. Each component of the O&M program is designed to protect the health of the individuals directly involved as well as the general building occupants. Only through a carefully developed and implemented O&M program, can a safe work environment be ensured in an asbestos-containing building.

ASBESTOS OPERATIONS AND MAINTENANCE PROGRAM FOR THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

POLICIES AND PROCEDURES

August 1, 1989
Draft

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PORT AUTHORITY OF NEW YORK AND NEW JERSEY

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PORT AUTHORITY OF NEW YORK AND NEW JERSEY O&M PROGRAM

1.0 Policy Statement

It has been determined that building materials used at Port Authority facilities include asbestos-containing material (ACM). According to recent studies and guidance documents, the mere presence of ACM in a building does not constitute a hazard. Rather, ACM presents a hazard when fibers are released and allowed to become airborne. Such releases are likely when friable ACM is disturbed or non-friable ACM is damaged.

The Port Authority is committed to maintaining a safe and healthy working environment for its employees, occupants, contracted building service personnel, and the public. The Port Authority has therefore established an Asbestos Management Program (AMP) which includes this Asbestos Operations and Maintenance (O&M) Program. This O&M program is established to monitor and control asbestos-related activities on a daily basis.

2.0 Purpose of Asbestos O&M Program

The Port Authority has established this O&M program to eliminate or minimize the release of airborne asbestos fibers. At its most basic level, an O&M program achieves this goal by

2.1 repairing damaged ACM,

2.2 preventing future damage to or uncontrolled disturbance of ACM, and

2.3 observing the condition of ACM to ensure that all material is maintained in good condition.

3.0 Components of O&M Program and Detailed Policies

There are ten basic components to an effective O&M program:

3.1 Establish Asbestos-Related Policies -- This program and the policies herein are prepared to conform with requirements under OSHA 1926.58, Appendix G, which call for an asbestos maintenance program to be initiated in facilities where ACM exists. Because specific policies are a necessary part of a building's asbestos management program, this program

establishes policies regarding informing people about the existence of asbestos, its potential hazards, and the methods used to abate the hazards in the particular building.

3.2 Notification -- OSHA 1926.58, Appendix G requires an inventory of all ACM in a building. The results of the survey should be made available to any parties who may have a potential for disturbing ACM.

All building staff personnel prohibited from disturbing ACM will be notified about the presence of ACM through 4-hour awareness sessions. Additional training and education will be provided to building employees who will disturb asbestos during O&M asbestos activities.

If there is insufficient time to determine if a material is ACM (whether through sampling or obtaining the survey report), treat the material as ACM.

3.3 Personal protective equipment (PPE) -- Each employee required to perform asbestos O&M activities will be provided respirators approved by MSHA and NIOSH for asbestos. Disposable clothing will be stored at each facility for use by these personnel.

The use and maintenance of respirators must be conducted in accordance with the P.A. Respiratory Protection Program and this O&M program.

3.4 Air sampling -- Although the safe work procedures established in this program are intended to minimize the release of airborne asbestos fibers, the Port Authority will conduct two types of air sampling to monitor any changes in airborne concentrations.

a. Area (background) sampling - samples will be collected periodically in building areas, during normal work conditions. This sampling will be conducted by the Asbestos Management and Compliance Division.

b. Personal sampling - at the inception of the O&M program, the Risk Management Division will collect samples on a representative number of building personnel performing asbestos-related activities to establish an objective baseline of exposure to airborne fibers. Samples will also be taken periodically thereafter. Such data will be made available to building personnel.

3.5 Medical surveillance -- All Port Authority employees required to wear respiratory equipment as part of this O&M program must be given an initial medical exam, following OSHA guidelines in 29 CFR 1926.58 (m), to establish that they are medically fit to wear a respirator. Medicals will also be conducted annually thereafter.

3.6 Safe work procedures -- Federal OSHA regulations, in 29 CFR 1926.58 Appendix G, require that an employer must establish written work procedures for "small-scale, short-duration," O&M, activities. The Port Authority's work procedures are spelled out starting in section 10.0 of this program. All Asbestos O&M personnel will be trained in these procedures and will follow them during actual work.

3.7 Safety Equipment -- Because asbestos may pose a hazard when it becomes airborne, equipment manufacturers have developed special devices which either filter, trap, or weigh or lock down asbestos fibers. (Examples include HEPA vacuums, glove bags, and surfactants and encapsulants, respectively.) This equipment, in addition to basic hand tools such as knives, must be maintained on site to perform O&M activities. Ordinary power tools must not be used with ACM.

A sufficient supply of safety equipment will be maintained at each facility. The equipment will be stored in areas designated by the Facility Asbestos Coordinator. Records of equipment use and maintenance will be kept. Safety equipment will be used only for asbestos-related activities and only by approved asbestos O&M personnel.

3.8 Observing ACM condition -- Personnel will be trained to recognize damage to ACM and will document any change in conditions on ACM Condition Forms (see Form B, section 7.0). Employees should note any changes in ACM condition. Changes in space activity which may affect the ACM's condition should also be recorded. All forms will be delivered to the Facility Asbestos Coordinator.

3.9 Documentation/Recordkeeping -- Regulatory standards and liability issues require an employer and/or building owner to maintain records of all asbestos-related activities. Documents including, but not limited to, the following, will be retained by PA.

a. Air sampling data: Description of the air sampling protocol, work operations, and other relevant data recorded to allow the described activities to be exempt from initial air monitoring as required by OSHA 29 CFR 1926.58(f)(2). Air sampling data shall be maintained for as long as the Port Authority uses this data, or for at least thirty years.

b. Medical surveillance: Results of employee medical examinations must be maintained for the duration of employment plus thirty years.

c. Training records: Training records shall be maintained for the duration of employment plus thirty years.

d. Respirator fit-tests: Respirator records shall be maintained for the duration of employment plus thirty years.

e. Asbestos-related activities: Document of asbestos-related emergencies and asbestos condition reports shall be maintained for as long as the Port Authority uses this data, or for at least thirty years.

Information specific to each individual Port Authority employee shall be made available to that individual or his/her designated representative.

3.10 Training -- Training plays an integral role in establishing an O&M program. Through two-day training in policies and procedures for O&M asbestos personnel, awareness training for other PA employees, and various other training as needed, the Port Authority will work to insure that persons involved in building activities will not create asbestos hazards.

All personnel who will be assigned to perform asbestos-related O&M work will attend a two-day O&M course. Other affected PA employees will attend four-hour awareness seminars.

4.0 Scope of O&M Activities

Employees who have been approved to perform O&M activities are authorized to disturb ACM only in the process of conducting routine activities. In addition, these personnel are not to disturb installed friable ACM in amounts greater than 10 linear or 10 square feet.

5.0 Scheduling of Work

If work must take place in a public or tenant area, where feasible, work shall be scheduled during off hours or the work evacuated area must be restricted. Asbestos-related O&M work in unoccupied areas can take place during regular business hours.

6.0 Responsibility for Enforcement

The facility manager or his/her designated representative will insure compliance with this O&M program.

7.0 Documentation Forms

FORM A

ASBESTOS-RELATED O&M PROJECT
DOCUMENTATION FORM

Port Authority of New York and New Jersey

DATE OF NOTIFICATION TO FACILITY ASBESTOS COORDINATOR: _____
DATE JOB PERFORMED: _____ REPORT COMPLETED BY: _____
LOCATION: _____
FACILITY: _____

Estimated amount of ACM disturbed _____ (linear ft/square ft)

Reason for disturbing ACM _____

MAINTENANCE PERSONNEL:
EQUIPMENT CHECKLIST

*Disposable Coveralls	___	Disposable Towels	___	*Water Sprayer	___
*Poly Sheeting	___	Encapsulant	___	*HEPA Vacuum	___
Utility Knives	___	Paint Brushes	___	HEPA Exhaust Unit	___
*Asbestos Waste Bags	___	Duct Tape	___	*Respirator-HEPA-Filters	___
Glove Bag	___	Scrim Cloth	___	Wettable Pipe	___
Smoke Tubes	___	Surfactant	___	Wettable Pipe Wrap	___

*MANDATORY EQUIPMENT

MAINTENANCE SUPERVISION

1.	Maintenance personnel trained as O&M personnel	___ yes	___ no
2.	Signs posted and access to area restricted	___ yes	___ no
3.	Proper isolation of work area	___ yes	___ no
4.	Pre-labelled approved waste bags at location	___ yes	___ no
5.	Protective Equipment in use	___ yes	___ no
6.	Asbestos wetted	___ yes	___ no
7.	Area cleaned up of debris	___ yes	___ no
8.	Disposable clothing in container	___ yes	___ no
9.	Bags moved to posted storage area	___ yes	___ no
10.	Amount of waste generated (# of bags)	_____	

Signature: _____
Mtc. Supervisor

RETURN TO FACILITY ASBESTOS COORDINATOR

PERSONNEL PERFORMING WORK:

NAME: START: _____ END: _____

NAME: START: _____ END: _____

FORM B

ASBESTOS CONDITION REPORT

Port Authority of New York and New Jersey

Report Filed by: _____
Position: _____
Date: _____

Area Inspected: _____

Type of ACM Examined: _____

Facility: _____

Exact Location: _____

Change in Condition: ____ Yes ____ No

If yes, describe new condition: _____
_____
_____

Size of area with changed condition: _____ SF / LF

Describe suspected cause of change: _____
_____
_____

Response necessary: ____ Yes ____ No

If yes, describe proposed response: _____
_____
_____

RETURN TO FACILITY ASBESTOS COORDINATOR

Date Received by FAC: _____

Dated Inspected Site: _____

Response Action: _____

Response Priority: ____ (1 = highest, 3 = lowest)

Response Assigned to: _____

FAC Signature: _____

8.0 Equipment Maintenance and Storage

8.1 A list of equipment required to implement the O&M Program is included with this document. The Facility Asbestos Coordinator will ensure the purchase and maintenance of approved equipment and supplies.

8.2 Asbestos safety equipment shall be stored separately from general maintenance supplies. This is to prevent the use of labelled materials, such as disposal bags, for non-asbestos purposes.

It is extremely important that any equipment with potential interior contamination be stored separately from general equipment. These items, such as the HEPA Vacuum, shall be labelled, "For Asbestos Work Only."

8.3 The Facility Asbestos Coordinator will be responsible for overseeing the maintenance of asbestos safety equipment.

The exterior contamination on equipment must be cleaned off before removing the equipment from the worksite.

Special precautions must be taken when emptying asbestos waste from a HEPA vacuum or changing contaminated filters. This procedure must always take place in an isolated work area with proper respiratory protection and protective clothing. The asbestos-containing debris shall be wet down with (amended) water as the vacuum is opened. Place the wet material directly into an asbestos disposal bag. Wet wipe the inside of the vacuum completely. Any used filters shall be disposed of as asbestos-containing waste.

Wet wipe the exterior of the vacuum before removing it from the isolated area. Place contaminated clothes in disposal bag.

In addition to these procedures, the manufacturer's instructions shall be followed.

9.0 Air Sampling

9.1 Periodic Area Sampling

As part of the Port Authority's overall Asbestos Management Program, an air monitoring program will

be established. Area air samples will be taken periodically by the Asbestos Management and Compliance Division.

9.2 Personal Sampling

OSHA 29 CFR 1926.58 requires that initial personal air monitoring be conducted for asbestos-related work, including clean-up and maintenance that will disturb ACM. There are three specific airborne fiber levels that must be measured for in the work place. The first is the "Permissible Exposure Limit" of 0.2 f/cc measured over an 8 hour time-weighted average (TWA). The second is the "excursion limit" of 1.0 f/cc measured on a 30 minute period. Samples for the "excursion limit" must be taken at the point when "peak" exposures to airborne asbestos are most probable. If either of these limits is reached, OSHA requires that a regulated area be set up. In a regulated area, very specific isolation procedures, work practice and engineering controls, and decontamination procedures must be followed.

The third fiber level is the "action level" of 0.1 f/cc measured over an 8-hour TWA. When this level is reached, an employer must perform periodic personal sampling, train the employees, and establish a medical surveillance program.

Because of the limited scope of anticipated contact with ACM by Port Authority employees, it is not likely that employees will be exposed to these levels of airborne asbestos fibers. It is required, however, that representative sampling results be documented for different types of asbestos-related work performed in the building. Once this data is obtained, it can be used as a reference for future Asbestos O&M jobs where similar work practices and control methods are used.

10.0 General Procedures for Asbestos Related Work - these procedures apply to all Port Authority personnel who may perform asbestos projects. All exceptions must be approved by the Manager of the Asbestos Management and Compliance Division or his designee.

10.1 GeneraL Preparation Steps for ALL Asbestos-Related O&M Projects:

a. Assess Conditions - Determine if the materials to be handled contain asbestos. If, for any reason, you cannot determine the asbestos content or time does not permit sampling and analysis, TREAT THE MATERIAL AS ASBESTOS-CONTAINING. Determine what safety equipment will be necessary to complete the task.

b. Restrict Access to the Area -- Before starting the preparation for any project which may disturb ACM, restrict access to the area to only authorized (i.e., trained and protected) personnel by

1) Posting appropriate signs far enough from the work to prevent inadvertent entry. These signs shall conform to OSHA regulations found at 1926.58 and shall include the following

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

Note: Signs with additional, facility-specific information may be used.

2) Closing and sealing all critical barriers.

When the work is in a large open space, restrict access to the area by

3) Barricading the area with appropriate markings.

c. Isolate the Area -- Shut down and/or isolate all HVAC systems passing through the work area.

d. Protect the Area - Cover all non-moveable items and the floor with polyethylene sheeting.

e. Wear Protective Equipment - Put on all necessary personal protective equipment (PPE) before disturbing any ACM. Respirators and two layers of full-body disposable clothing shall be worn at all times while working with asbestos-containing materials. The use of respirators shall conform to the requirements set forth in the P.A. Respiratory Protection Program.

f. Prevent the Release of Airborne Fibers - Thoroughly wet all ACM with amended water to prevent emission of airborne filters.

g. Interruptions or Unexpected Difficulties - If, after starting the project, for any reason, you cannot comply with any applicable procedure, need to leave the area or the scope of work has significantly changed, STOP THE JOB, perform any necessary decontamination procedures, and inform your supervisor at once.

Note: When ACM will be directly disturbed by on O&M activity, the following precautions must be implemented:

Use duct tape, polyethylene sheeting, and/or caulking to close all openings into both the supply and return divisions of the HVAC system. Shut down and/or isolate any electrical outlets or devices.

Pre-clean, with a HEPA vacuum, and remove all moveable items from the area. Pre-clean, with a HEPA vacuum, all non-moveable items and carpeting.

10.2 General Clean-up Steps for ALL Asbestos Related Work

a. Place all ACM and asbestos-contaminated waste in approved asbestos waste bags. The disposal bags must be labelled according to OSHA and DOT requirements. The required OSHA wording is

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

The required DOT wording is

RQ HAZARDOUS SUBSTANCE
SOLID, N.O.S. (ASBESTOS)
NA 9188
ORM-E

b. Wet the materials further before twisting and sealing the bag with duct tape.

c. Place bag inside another approved asbestos waste bag. All asbestos-containing waste must be double-bagged. Place additional amended water in the second bag and twist and seal with duct tape.

d. Label all bags to include the name of the waste generator, the date and location from which the waste was removed.

e. Decontaminate all asbestos-contaminated materials and equipment. Dispose as asbestos-containing waste, all materials and equipment which cannot be decontaminated (e.g., mops).

f. HEPA-vac the area.

g. Remove polyethylene sheeting. Always remove poly by rolling from all ends towards the middle. Place poly in approved asbestos waste bags following above procedure.

h. Leave all barriers in place, including seals on HVAC systems, until the project is completed.

10.3 Removal of Protective Equipment and Personal Hygiene

a. Wet wipe and HEPA-vac outer disposable suit.

b. Remove outer disposable suit by rolling it inside-out.

c. Dispose of suit as asbestos-contaminated waste.

d. Repeat above three steps for second disposable suit.

e. HEPA-vac and wet-wipe respirators before removal. (See details for removing respirators in the PA Written Respiratory Protection Program).

*f. Upon completion of any O&M asbestos project, launder work clothes and shower. Work clothes worn during an asbestos related work must not be taken home.

10.4 Storage and Disposal of Asbestos-Containing Waste - Store all asbestos-containing waste in a secured area until a sufficient volume is obtained to warrant deliver to an approved landfill by a licensed hauler.

10.5 Documentation - Fill out Form A and submit it to the FAC.

11.0 Special Procedures for Asbestos Related Work - Always perform the proper General Procedures before and after these procedures.

11.1 Special Procedures for Above Ceiling Access

The following instructions outline the procedures to be utilized whenever an individual at a Port Authority Facility must, for any reason, enter a ceiling space which is contaminated with asbestos containing material. The degree of containment necessary depends on the types of activity performed. Whenever an asbestos O&M activity is performed the procedures outlined in 11.1 a. should be performed. When bulk sampling work, structural integrity inspections or other activities (that do not typically require the disturbance associated with abatement of ACM) are performed the procedures outlined in 11.1. b. should be followed:

11.1.1 Enclosure

a. When it is necessary to remove ceiling tiles to gain adequate access above a suspended ceiling, an enclosure may be built from the floor to suspended ceiling around the area of access, <u>if it is not feasible to remove all equipment from the area and protect remaining surfaces</u>.

---

* May be revised before implementation.

b. The enclosure will be constructed of 2 layers of 6-mil polyethylene sheeting hung on a wooden frame. The enclosure shall be built before any ceiling tiles are removed. Portable isolation chambers may be made available for this purpose.

c. If the enclosure is deemed necessary, perform general isolation procedures. If equipment can be removed and surfaces protected, see 11.1.2.

d. Carefully remove ceiling tiles where work will take place.

e. Thoroughly HEPA vacuum the tops of all surrounding tiles and other surfaces making sure not to disturb any loose debris.

f. Using an airless water sprayer, mist the area on top of all surrounding tiles.

g. Perform job and then carefully replace ceiling tiles.

h. Perform general cleanup and disposal procedures.

11.1.2 Modified Enclosure Procedure

a. Establish work boundary and contain with caution tape and traffic cones.

b. Place and secure 6-mil flame retardant poly sheeting on the floor beneath the work area. Other surfaces directly adjacent to part of the work area should also be protected by poly sheeting.

c. Set up ladders or scaffold (scaffold or ladder must conform with PA specs and OSHA requirements).

d. Connect HEPA vacuum to a power source and assemble needed attachments.

e. Set out hand tools and protective equipment.

f. Mix and pour amended water into a Hudson or hand sprayer. Fill a second Hudson or hand sprayer with plain water. Mix and pour amended water into an airless water sprayer.

g. Don personal protective equipment; double tyvek suits must be worn.

h. Ceiling tiles may only be disturbed by personnel in full protective equipment (i.e., NIOSH/MSHA approved respirators with HEPA filters, disposable suits and gloves).

i. Depending upon the type of ceiling construction, the following steps should be employed;

1) Hatch door openings.

- HEPA exterior of hatch door concentrating on the seams.

- Carefully loosen support screws and slowly, gently, open hatch door with HEPA vacuum in close proximity and continuous use. Vacuum entire top surface of hatch door as it becomes fully exposed.

- Once fully open, mist the door's top surface with amended water and wipe clean.

- HEPA vacuum the perimeter of the hatch within the ceiling space, and other structures which may be contacted as a result of the work/activity to be conducted. If necessary, mist structures with amended water and wipe clean. The HEPA vacuum is to remain in operation with the nozzle in the ceiling space for the remainder of the work/activity.

- Should the work/activity to be undertaken result in the disturbance of any asbestos containing material (ACM), any ACM which becomes dislodged should be vacuumed and the associated area sprayed with amended water and wet wiped. If ACM is damaged by the work/activity, the damaged area should be repaired to ensure that the potential for any future fiber release is mitigated. For example, should the covering of asbestos containing pipe insulation be ripped, this area must be sealed with duct tape. If a sprayed-on fireproofing material has been scraped or otherwise marred, the would must be encapsulated.

- Once the work/activity is completed, vacuum the upper surface of the adjacent ceiling structure and then spray the area (lightly) with encapsulant. The hatch may then be sealed. The ladders or scaffold used is then HEPA vacuumed along with all tools used in the activity.

2) Drop Ceiling Panels

- HEPA vacuum surface of ceiling tile(s) to be removed and limited perimeter tiles.

- Carefully lift panel from grid with HEPA vacuum in close proximity and continuous use.

- The panel must be slid partially into the ceiling space to allow a worker to enter the ceiling space and HEPA vacuum the top of the tile being removed and the tops of surrounding tiles and adjacent structures. If deemed necessary mist these structures with amended water and wipe clean. The HEPA vacuum is to remain in operation with the nozzle in the ceiling space for the remainder of the work/activity.

- Should the work/activity to be undertaken result in the disturbance of any Asbestos Containing Material (ACM), any ACM which becomes dislodged should be vacuumed and the associated area sprayed with amended water and wet wiped. If ACM is damaged by the work/activity, the damaged area should be repaired to assure that the potential for any future fiber release is mitigated. For example, should the covering of asbestos containing pipe insulation be ripped, this area must be sealed with duct tape. If a sprayed-on fireproofing material has been scraped or otherwise marred the wound must be encapsulated.

- Once the work/activity is completed vacuum the upper surface of the adjacent ceiling structure and then spray the area (lightly) with encapsulant. The tiles can then be replaced. The ladders or scaffold used is then HEPA vacuumed along with all tools used in the activity.

3) Interlocking Ceiling Tiles

- Where possible, entrance into interlocking ceiling tiles should be at those locations where access buttons are present.

- When removing a tile which has access buttons, carefully loosen the tile with the HEPA vacuum in close proximity and in continuous operation. Lower the tile slowly to permit HEPA vacuuming of the top surface of the tile.

- If tiles need to be cut for removal, score the tile with a razor with the HEPA vacuum in close proximity and in continuous operation.

- Prior to the removal of any additional tiles, HEPA vacuum the top surface of the adjacent tiles and any other adjacent structures. If considered necessary, mist structures with amended water and wipe clean. The HEPA vacuum is to remain in operation with the nozzle in the ceiling space for the remainder of the work/activity.

- Should the work/activity to be undertaken result in the disturbance of any Asbestos Containing Material (ACM), an ACM which becomes dislodged should be vacuumed and the associated area sprayed with amended water and wet wiped. If ACM is damaged by the work/activity, the damaged area should be repaired to assure that the potential for any future fiber release is mitigated. For example, should the covering of asbestos containing pipe insulation be ripped, this area must be sealed with duct tape. If a sprayed-on fireproofing material has been scraped or otherwise marred the wound must be encapsulated.

- Once the work/activity is completed vacuum the upper surface of the adjacent ceiling structure and then spray the area (lightly) with encapsulant. The tiles can then be replaced. The ladders or scaffold used is then HEPA vacuumed along with all tools used in the activity.

j. Under no circumstances should a ceiling space which is contaminated with asbestos containing material be left open. At minimum poly should be duct taped over any opening until the applicable ceiling material can be replaced.

k. Mist the floor poly, remove protective clothing and outer disposable suit while standing on the poly, and then fold in suits and poly for disposal in U.S. EPA/DOT approved waste bags. Respirators must be worn throughout the entire procedure.

l. HEPA vacuum the floor, surfaces within the designated work site and all equipment used as part of the activity.

m. With a spray bottle containing plain water, gently mist facial area and tyvek suit then remove suit and dispose of in U.S./DOT approved waste bag. Respirator may then be removed.

11.2 Special Procedures for Repairing Asbestos-Containing Pipe Insulation Following a Fiber Release Episode.

a. Pre-clean the area using a wet-mop and/or HEPA vacuum.

b. Place polyethylene sheeting under the pipe area to be repaired.

c. Apply encapsulant liberally to the damaged pipe insulation with a disposable paint brush.

d. Wrap scrim cloth or re-wettable fiberglass tightly around the coated area. Cut the wrapping material to fit with a razor knife.

e. Apply a second coat of encapsulant over the wrapping material, being careful to cover the entire work area. Enough encapsulant should be used to completely cover the wrap.

f. Allow the encapsulant to dry for 10-12 hours or as directed by the manufacturer.

g. Dispose of brush and poly as asbestos-containing waste.

h. Wet-mop and HEPA vacuum the area.

i. Perform all other general clean up and disposal procedures.

11.3 Special Procedures for Glove Bag Removal of Asbestos-Containing Pipe Insulation During Emergency Asbestos Situations.

a. Pre-clean the area using a wet-mop and/or HEPA vacuum.

b. Place polyethylene sheeting under the pipe area to be removed.

c. Place all appropriate tools in the Glove Bag pouch.

d. Slice, from the open end of the bag along the folds, a length longer than the width of the pipe with insulation. Reinforce the cut edges of the bag with duct tape.

e. Fold the bag around the pipe and duct tape the top edges together.

NOTE: Leave enough space around the pipe to allow for access to the top of the ACM.

f. Seal the bag around the pipe with duct tape. The seals should be tight to avoid air leakage and strong to hold the bag to the pipe as it fills with ACM.

g. Cut two "X" holes in the bag with a razor knife. (There may be stickers which mark where to cut.)

h. Insert the nozzle of the HEPA vacuum in one hole and seal it with duct tape.

NOTE: Do not turn the vacuum on yet.

i. Insert a smoke tube in the other hole and test the seal of the bag for breeches.

j. Remove smoke tube and insert water sprayer and seal it with duct tape.

j. Insert your arms into the sleeves/gloves of the bag and carefully remove ACM from the pipe.

NOTE: You may need to wet the ACM repeatedly if the insulation does not come off quickly.

k. Brush and/or wipe the pipe clean to remove any visible residue.

l Seal newly exposed ends of insulation with re-wettable cloth or encapsulant.

m. Wipe down inside of bag to settle all debris at the bottom.

n. Grab all re-usable tools in one hand and invert the sleeve so that the glove is now lying outside of the bag with the tools inside the glove.

o. Twist the sleeve, wrap duct tape around, and cut the sleeve off through the tape.

p. Turn on the HEPA vacuum to remove all contaminated air from the bag.

q. Hold an approved pre-labelled asbestos waste bag under/around the Glove Bag.

r. Twist the bag as close as possible to the pipe and wrap tape around the twist.

s. Remove the bag, one end at a time, from the pipe, and lower it into the waste bag.

t. Cut the water sprayer and vacuum away from the bag.

u. Check the seal on the encapsulated ends of the insulation. Apply more encapsulant, or cloth if necessary.

v. Apply color-coded encapsulant to area where ACM was removed.

w. Perform all general cleanup and disposal procedures.

11.4 Special Procedures for Clean-Up of Fallen Debris

Perform all general isolation and personal protection procedures first, then:

a. In a manner that minimizes generation of airborne dust, scoop and the ACM up and place it in an approved asbestos waste bag. Follow general procedures for waste storage.

b. After removing the ACM, wet-mop and vacuum the area with a HEPA vacuum.

c. If small amounts of ACM are present, use the HEPA vacuum to clean up the debris.

d. Inspect the area for remaining debris before allowing re-access. Re-cleaning may be necessary.

11.5 Special Procedures for Coring and Drilling of Vinyl Asbestos Tiles (VAT)

a. VAT's shall be misted down prior to any coring or drilling.

b. Any drilling or coring devices used shall be equipped with HEPA-filtered vacuums.

(* Some devices may have water attached as as well - these are preferred.)

c. Any residual dust shall be wet wiped and mopped to complete the process.

d. Perform all general clean-up and disposal procedures.

11.6 Procedures for Removing Asbestos-Containing Cloth Wrapping from High-Voltage Cables

Because of the unique conditions that PATH employees must work under, many of the general procedures developed for asbestos O&M work in buildings cannot apply. However, the following steps should be followed in order to reduce the potential for fiber release.

a. Before beginning any work activity in manholes, follow all the general work procedures developed by PATH for safely working along train tracks.

b. Ensure that the cable you are going to work on and as many others in the area as possible have been shut down and locked out.

c. When working with asbestos-containing materials, it is important to reduce the flow of air through the area. When it is possible to isolate the work area through the use of a mini-enclosure, such a method should be employed.

d. Whether or not isolation is possible, restrict access to the area by posting the appropriate warning signs at all entrances to the area. Arrange with your supervisor that during the time you are working on the cable wrap, no other work crews shall pass through the area. If other work crews must pass, immediately stop work and clean the area with a HEPA vacuum.

e. When it is deemed feasible by your supervisor to use the glove bag method for removing the asbestos-containing cloth, perform the same steps as if you were removing pipe insulation. However, when using water, use adequate but sparing amounts.

f. When it is not possible to use a glove bag, begin by cleaning the cable and area with a HEPA vacuum.

h. Use a damp sponge or low volume airless sprayer to wet the cloth wrapping thoroughly. Use amended water for this task. This may require a lot of time but should be performed cautiously due to the proximity of live cables.

i. Remove the cloth wrapping, checking to make sure that the wrapping remains wet.

j. Immediately place the wrapping into an approved asbestos waste bag. Wet the waste inside the bag.

k. Wipe the newly exposed wires with a damp cloth or sponge. Then clean the newly exposed areas with a HEPA vacuum.

l. Perform cable splicing activities being careful not to disturb the remaining asbestos-containing materials.

m. Re-wrap the cable using non-asbestos cloth

n. Wrap and seal the seam with cloth and encapsulant.

o. Close and seal the bag.

p. Perform general clean up and decontamination procedures.

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FACILITY OPERATIONS AND MAINTENANCE RESPONSE TO ASBESTOS FALLOUT CONDITIONS REQUIRING SURFACE DECONTAMINATION: FLOORS AND VERTICAL SURFACES

GENERAL REQUIREMENTS:

A) In accordance with Port Authority policy ACP-01-4/90, all asbestos operations and maintenance activities shall be performed by Port Authority staff who have attended and successfully completed a minimum of sixteen hours of asbestos operations and maintenance training conducted by a certified training agency.

B) All asbestos operations and maintenance staff shall have had a current medical examination in accordance with the U.S. Department of Labor - OSHA regulation, 29 CFR 1926.58 (m). The issuance and maintenance of respirators shall be in accordance with OSHA 29 CFR 1926.58 (H), 1910.134, and the Port Authority's Respirator Program. The selected mask and filter(s), known as the respirator, must provide the required protection factor for the type and concentration of the airborne hazard.

C) In accordance with OSHA 29 CFR 1926.58 (F), personal exposure monitoring shall be conducted by the Environmental Management Division at a frequency which will adequately represent staff exposure during the performance of various response actions.

D) The Asbestos Management Division shall monitor response actions when appropriate and collect environmental air samples.

E) Copies of the Port Authority's "Operations and Maintenance Project Documentation Form" and "Asbestos Condition Report" shall be forvarded to the Asbestos Management Division for reviev and retention.

SITE RESPONSE:

A) Upon arrival to the response site, the Operations and Maintenance Supervisor shall evaluate the asbestos fallout condition and determine the cause, extent of surface contamination, and boundary of the proposed work area. Area demarcation utilizing "Asbestos, Danger" posting tape or signs vill be established.

B) The Supervisor shall determine what facility operations and services will be impacted as a result of the response. An evaluation shall include but not be limited to: response site occupancy and use; availability of utility services and impact of response usage; ventilation systems which may require shut-dovns; and contaminate spread in area or outside.

C) The supervisor shall determine the response parameters in accordance with the recommended procedure outlined belov:

1) <u>FLOOR DECONTAMINATION</u>

a) With staff in proper personal protective equipment, the asbestos fallout on the floor shall be lightly misted with an approved amended water to prevent dust reintrainment. Care should be taken not to over saturate the asbestos debris on the floor so that a slurry does not form making HEPA vacuuming more difficult. Also, the pressure from the water sprayer should gently mist the asbestos debris, not air blast it.

b) While the asbestos debris is absorbing the amended water, a decontamination line or station shall be established with either a shover chamber, a unit with vet/dry decontamination capacity (personal and equipment decontamination through water sprayers and HEPA vacuums) or a designated space on site for decontamination. This decontamination system can be one of the folloving depending upon the nature of the response and space available: an inflatable unit providing an area for personal and equipment decontamination; a "pop-up" unit providing an area for personal and equipment decontamination; or an isolated area within the vorksite where fire rated six mil plastic sheeting can be taped to the floor so that all personal and equipment decontamination can occur on it. In each case, the decontamination station must be incorporated into the clean-up of the area.

c) Personal protective equipment shall be vorn by all vorkers within the regulated response area. If a shover unit is provided within the established decontamination line, then vorkers will be required to vear one disposable suit. If a decontamination station vith vet/dry

capacity is provided, then all workers must wear two disposable suits. If heat stress is of concern, the Asbestos Management Division must be contacted to discuss the alternatives. As required, proper respiratory protection suitable for the airborne hazard and concentration must be worn by all workers within the regulated response area.

d) HEPA vacuuming shall proceed from the outer perimeter working inward. Several passes in a crisscross fashion shall be performed to reduce the possibility of any asbestos debris remaining in cracks, crevices, or embedded in carpet fibers. Following HEPA vacuuming, all hard floors (tiles, terrazzo, marble, concrete, asphalt, etc.) shall be wet mopped using amended water. Depending upon the extent of asbestos fallout on carpeted areas, steam cleaning should be performed following initial HEPA vacuuming.

e) Upon completion of the decontamination phase of the response, personal and waste decontamination will commence. All waste (excluding the contents of the HEPA vacuum) shall be properly wet down and collected into six mil asbestos waste bags with the current U.S. EPA/DOT asbestos warning labels, and required NESHAPS building owner and location notice. This primary bag shall be HEPA vacuumed and double-bagged. All bags shall be goose neck twisted and sealed with duct tape. Depending upon the type of decontamination system in use which is dependent upon the response parameters, either the workers will shower within the decontamination unit (all shower waste water must be: HEPA micron filtered and then drained, mixed with asbestos debris and disposed of as asbestos waste; or drummed and disposed of as asbestos

contaminated water with the proper liquid warning labels).

If decontamination is through wet/dry capacity, then the following procedure will be followed: while standing on the plastic sheeting or within the specific chamber of the decontamination line, each worker shall HEPA vacuum the other; following the vacuuming, they will spray each other with the amended water and then remove the outer suit; this process will be repeated for the second suit; before removing the second suit, all plastic sheeting shall be wet down; the second suit shall be removed and dropped into the center of the plastic sheet or within the chamber; all sheeting will then be invardly folded and bagged; once bagged, the respirators will be removed.

f) All waste shall be transported to a designated temporary storage location on the facility approved by the Asbestos Management Division. No other waste may be permitted to be stored in this area. The Operations and Maintenance supervisor shall use the Asbestos Management Division "Asbestos Waste Checklist" and when transported for disposal, the Asbestos Management Division's "Asbestos Waste Manifest."

2) <u>VERTICAL SURFACES</u>

a) With staff in proper personal protective equipment, the floor beneath the wall surface shall be HEPA vacuumed for a radius to be determined by the Operations and Maintenance Supervisor.

b) A decontamination line or station shall be established with either a shover chamber, a unit with vet/dry decontamination capacity (personal and equipment decontamination capacity (personal and equipment decontamination through water sprayers and HEPA vacuums) or a designated space on site for decontamination. This decontamination system can be one of the following depending upon the nature of the response and space available: an inflatable unit providing an area for personal and equipment decontamination; a "pop-up" unit providing an area for personal and equipment decontamination; or an isolated area within the worksite where fire rated six mil plastic sheeting can be taped to the floor so that all personal and equipment decontamination can occur on it. In each case, the decontamination station must be incorporated into the clean-up of the area.

c) Personal protective equipment shall be worn by all workers within the regulated response area. If a shover unit is provided within the established decontamination line, then workers will be required to wear one disposable suit. If a decontamination station with vet/dry capacity is provided, then all workers must wear two disposable suits. If heat stress is of concern, the Asbestos Management Division must be contacted to discuss the alternatives. As required, proper respiratory protection suitable for the airborne hazard and concentration must be worn by all workers within the regulated response area.

d) HEPA vacuuming shall proceed from the highest location on the wall surface and work downward. Several passes in a crisscross fashion shall be performed to reduce the possibility of any asbestos debris

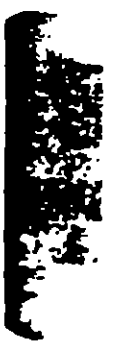
remaining in cracks, crevices, or embedded in wall covering fabric. Following HEPA vacuuming, all hard wall surfaces (ceramic tiles, marble, mason block, sheetrock, etc.) shall be wet cleaned using amended water. Depending upon the extent of asbestos fallout on fabric wall covering, wet cleaning should be performed following initial HEPA vacuuming. If necessary, wall treatment removal may be required if asbestos trailings cannot be removed by vacuuming or wet cleaning.

e) Upon completion of the decontamination phase of the response, personal and waste decontamination will commence. All waste (excluding the contents of the HEPA vacuum) shall be properly wet down and collected into six mil asbestos waste bags with the current U.S. EPA/DOT asbestos warning labels, and retired NESHAPS building owner and location notice. This primary bag shall be HEPA vacuumed and double-bagged. All bags shall be goose neck twisted and sealed with duct tape. Depending upon the type of decontamination system in use which is dependent upon the response parameters, either the workers will shower within the decontamination unit (all shower waste water must be: HEPA micron filtered and then drained, mixed with asbestos debris and disposed of as asbestos waste; or drummed and disposed of as asbestos contaminated water with the proper liquid warning labels).

If decontamination is through wet/dry capacity, then the following procedure will be followed: while standing on the plastic sheeting or within the specific chamber of the decontamination line, each worker shall HEPA vacuum the other, following the vacuuming, they will spray each other with the amended water and then remove the outer suit; this

process will be repeated for the second suit; before removing the second suit, all plastic sheeting shall be vet down; the second suit shall be removed and dropped into the center of the plastic sheet or within the chamber; all sheeting will then be invardly folded and bagged; once bagged, the respirators will be removed.

f) All waste shall be transported to a designated temporary storage location on the facility approved by the Asbestos Management Division. No other waste may be permitted to be stored in this area. The Operations and Maintenance supervisor shall use the Asbestos Management Division "Asbestos Waste Checklist" and when transported for disposal, the Asbestos Management Division's "Asbestos Waste Manifest."



Cardinal

FORM A

ASBESTOS-RELATED PROJECT
DOCUMENTATION FORM

Port Authority of New York and New Jersey

DATE OF NOTIFICATION TO ASBESTOS PROJECT COORDINATOR: _____
DATE JOB PERFORMED: _____ REPORT COMPLETED BY: _____
LOCATION: _____
FACILITY: _____

Estimated amount of ACM impacted _____ (linear ft/square ft)

Reason for impacting ACM _____

MAINTENANCE PERSONNEL:
EQUIPMENT CHECKLIST

*Coveralls	___	Disposable Towels	___	*Water Sprayer	___
*Poly Sheeting	___	Encapsulant	___	*HEPA Vacuum	___
Utility Knives	___	Paint Brushes	___	HEPA Exhaust Unit	___
*Asbestos Waste Bags	___	Duct Tape	___	*Respirator-HEPA-Filters	___
Glove Bag	___	Scrim Cloth	___	Wettable Pipe	___
Smoke Tubes	___	Surfactant	___	Wettable Pipe Wrap	___

*MANDATORY EQUIPMENT

MAINTENANCE SUPERVISION

1.	Maintenance personnel trained as O&M workers	___ yes	___ no
2.	Signs posted and access to area restricted	___ yes	___ no
3.	Proper isolation of work area	___ yes	___ no
4.	Pre-labelled approved waste bags at location	___ yes	___ no
5.	Protective Equipment in use	___ yes	___ no
6.	Asbestos wetted	___ yes	___ no
7.	Area cleaned up of debris	___ yes	___ no
8.	Disposable clothing in container	___ yes	___ no
9.	Bags moved to posted storage area	___ yes	___ no
10.	Amount of waste generated (# of bags)	_____	

Signature: _____
Supervisor on Site

RETURN TO ASBESTOS PROGRAM COORDINATOR

ON-SITE PERSONNEL:

NAME: TIME IN: _____ TIME OUT: _____

NAME: TIME IN: _____ TIME OUT: _____

FORM B

PERIODIC SURVEILLANCE ACTIVITIES

Port Authority of New York and New Jersey

Report Filed by: _____
Position: _____
Date: _____

Area Inspected: _____

Type of ACM Examined: _____

Facility: _____

Exact Location: _____

Change in Condition: ____ Yes ____ No

If yes, describe new condition: _____
_____
_____

Size of area with changed condition: _____ SF / LF

Describe suspected cause of change: _____
_____
_____

Response necessary: ____ Yes ____ No

If yes, describe proposed response: _____
_____
_____

RETURN TO ASBESTOS PROGRAM COORDINATOR

Date Received by APC: _____

Dated Inspected Site: _____

Response Action: _____

Response Priority: ____ (1 = highest, 3 = lowest)

Response Assigned to: _____

APC Signature: _____

SECTION I RECOMMENDED STANDARD EQUIPMENT FOR OPERATIONS AND MAINTENANCE PROJECTS:

1. PERSONAL PROTECTIVE EQUIPMENT:

- *Disposable tyvek suits with hood and boot attachments.*
- *Latex / Washable rubber gloves or disposable cloth workgloves.*
- *Safety goggles.*
- *Safety hard hat.*
- *Rubber boots with anti-skid soles.*
- *Safety vest.*
- *NIOSH / MSHA approved respirator suitable for exposure hazard:*

  A) *Half or full face negative pressure demand respirators with HEPA filters.*
  B) *Powered air purifying respirators (PAPR's).*

2. HAND TOOLS:

- *Razor / Electrician / Linoleum Knife.*
- *Pliers.*
- *Wire Cutters.*
- *Tin Snips.*
- *Hammer.*
- *Screw driver.*
- *Extension Cords / Drop Lights / GFCI.*
- *Lanterns.*
- *Large Spackle Knife and Tray.*

3. DECONTAMINATION EQUIPMENT:

- *Approved 6-mil glove bags and smoke tubes (size and sleeve number variable).*
- *Approved 6-mil waste bags.*
- *Approved drums for bulk materials.*

SECTION I RECOMMENDED STANDARD EQUIPMENT FOR OPERATIONS AND MAINTENANCE PROJECTS:

3. DECONTAMINATION EQUIPMENT - CONTINUED:

- *Duct tape.*
- *Hudson sprayer / spray bottles / amended water.*
- *6-mil flame retardant plastic.*
- *Lock-down sealant.*
- *Encapsulant.*
- *"Lag cloth".*
- *Patching compound.*
- *Disposable wash cloths / sponges.*
- *HEPA filter vacuum.*
- *Back-pack HEPA vacuum unit.*
- *Low velocity negative air unit.*
- *"Clean - tube".*
- *Traffic cones / containment caution tape.*

4. MISCELLANEOUS:

- *Ladders.*
- *Scaffolds.*
- *Portable generator / GFCI.*
- *Rough lumber / nails.*
- *Warning / Danger signs.*

JOB ANALYSIS IN THE DEVELOPMENT OF AN OPERATIONS AND MAINTENANCE PROGRAM

1. SITE ASSESSMENT:

Conduct an asbestos survey to determine the location, type, condition and exposure hazard potential within the building.

2. DETERMINE WHAT TRADES FUNCTION IN BUILDING:

- *MECHANICAL: HVAC, Plumbing.*
- *STRUCTURAL: Carpenters, Sheet Metal Workers, Interior / Exterior Demolition and Repair*
- *ELECTRICAL / TELECOMMUNICATIONS*
- *WATCH ENGINEERS*
- *PAINTERS*
- *GENERAL MAINTENANCE AND SANITATION*

3. ASSESS THE STANDARD OPERATING PROCEDURE OF EACH TRADE - EVALUATE:

- *Routine work.*
- *Seasonal work.*
- *Emergency responses.*

4. DEVELOPMENT OF AN OPERATIONS AND MAINTENANCE TRAINING PROGRAM:

THIS PROGRAM MUST ADDRESS .....

- *Reason for training.*
- *Medical concerns.*
- *Current regulations.*
- *Respiratory protection.*
- *Hazard recognition.*
- *Control options and responses through the modification of their standard operating procedures.*

5. PURCHASING OF EQUIPMENT AND STOCK MAINTENANCE